

PATENT ABSTRACTS OF JAPAN

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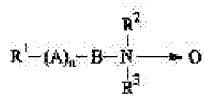
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(54) LIQUID DETERGENT

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain the subject liquid detergent that has excellent detergent effect and is particularly suitable for tableware and clothes by using an anionic surfactant, a specific surfactant, and a specific compound.

SOLUTION: This liquid detergent comprises (A) an anionic surfactant (for example, alkylbenzenesulfonate salt or the like), (B) a surfactant of the formula (R₁ is a 1-17C hydrocarbon; A is -CONH-, -COO⁻; n is 0, 1; B is a 1-5C alkylene where B is methylene in n=1; R₂ and R₃ are each a 1-3C alkyl, hydroxyalkyl) and (C) a compound of the formula: R₄-OCH₂CH(OH)CH₂OH (R₄ is a 1-18C hydrocarbon) In a preferred embodiment, the content of the component A is 0.1-50 wt.%, the component B is 0.1-30 wt.% and the component C is 0.5-30 wt.%, in addition, the weight ratio of the component A to the component B is 50/50-80/20.

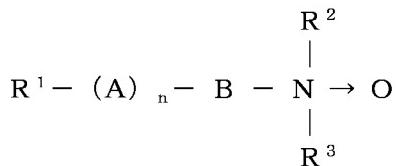


CLAIMS

[Claim(s)]

[Claim 1] (a) An anionic surfactant, the surfactant of the (b) general formula (I), and the liquid cleaning agent containing the compound of the (c) general formula (II).

[Formula 1]



For the inside R1 of [type, it is the hydrocarbon group of carbon numbers 7-17, A is -CONH- or -COO-, and n is the number of 0 or 1. Moreover, B is the alkylene group of carbon numbers 1-5, and B is a methylene group at the time of n= 0. R2 and R3 It is the alkyl group or hydroxyalkyl radical of carbon numbers 1-3.]

R4-OCH₂CH(OH)CH₂OH (II)

The inside R4 of [type is the hydrocarbon group of carbon numbers 1-18.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is [0002] about a liquid cleaning agent.

[Description of the Prior Art] The liquid cleaning agent used at ordinary homes can mention the cleaning agent for garments for removing the cleaning agent for hard surfaces for a metal, glass, a ceramic, plastics, etc., and the worn dirt of clothing. However, since the collar and cuff dirt of garments, tableware or the oil dirt of the circumference of a kitchen, etc. is very stubborn, the detergency can be satisfied only with the usual surfactant of a detergency is not obtained. For this reason, although the attempt which heightens a cleaning effect by blending a solvent with a cleaning agent was made, it was not what can still be satisfied.

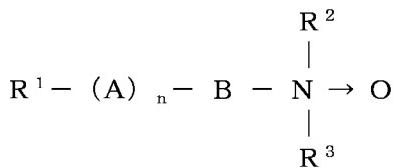
[0003] Therefore, the purpose of this invention is to offer a liquid cleaning agent suitable as the liquid cleaning agent excellent in the cleaning effect especially the object for tableware, or an object for garments.

[0004]

[Means for Solving the Problem] This invention relates to the (a) anionic surfactant, the surfactant of the (b) general formula (I), and the liquid cleaning agent containing the compound of the (c) general formula (II).

[0005]

[Formula 2]



[0006] For the inside R1 of [type, it is the hydrocarbon group of carbon numbers 7-17, A is -CONH- or -COO-, and n is the number of 0 or 1. Moreover, B is the alkylene group of carbon numbers 1-5, and B is a methylene group at the time of n= 0. R2 and R3 It is the alkyl group or hydroxyalkyl radical of carbon numbers 1-3.]

R4-OCH₂CH(OH)CH₂OH (II)

The inside R4 of [type is the hydrocarbon group of carbon numbers 1-18.]

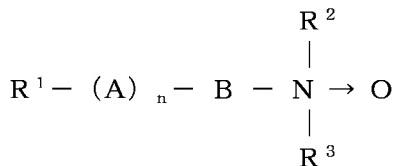
[0007]

[Embodiment of the Invention] The (a) component used by this invention is an anionic surfactant. Specifically Alkylbenzene sulfonates, Alkyl or an alkenyl ethereal sulfate salt, alkyl, or an alkenyl sulfate, An olefin sulfonate, an alkane sulfonate, a fatty-acid salt, alkyl, or alkenyl ether carboxylate, alpha-sulfo fatty-acid salt or its ester -- it can mention -- especially -- carbon numbers 8-18 -- desirable -- 10-14, and the number of ethylene oxide addition mols -- 1-8 -- desirable -- the alkyl of 1-6, or an alkenyl ethereal sulfate salt -- It is desirable carbon numbers 8-16 and to use preferably the linear alkylbenzene sulfonate of 10-14 or carbon numbers 8-18, and one or more sorts preferably chosen from the alkyl or the alkenyl sulfate of 10-16. A counter ion is one or more sorts chosen from alkali metal, alkaline earth metal, ammonium, and alkanolamine, and is one or more sorts preferably chosen from sodium, a potassium, magnesium, and ammonium.

[0008] In this invention, the compound of a general formula (I) is blended as a (b) component.

[0009]

[Formula 3]



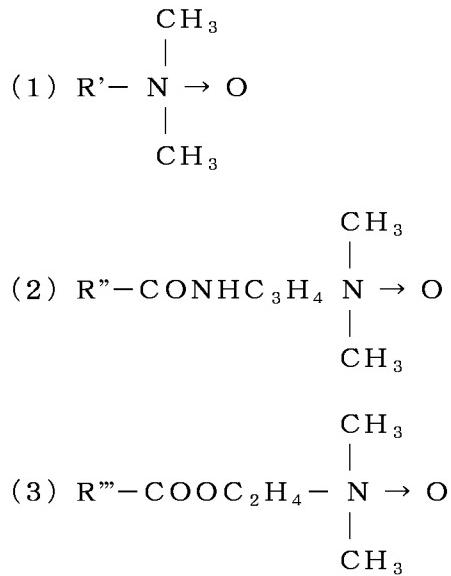
[0010] the inside R1 of [type -- carbon numbers 7-17 -- desirable -- the hydrocarbon group of 9-15 -- it is an alkyl group or an alkenyl radical preferably, A is -CONH- or -COO-, and n is the number of 0 or 1. Moreover, B is the alkylene group of carbon numbers 1-5, and B is a methylene group at the time of n= 0. R2 and R3 It is the alkyl group or hydroxyalkyl radical of carbon numbers 1-3.]

The compound of the following (1) - (3) can be mentioned as a desirable example of such a compound, and the compound of (1) or (2) is especially desirable in respect of the washing engine

performance.

[0011]

[Formula 4]



[0012] [-- here -- R' -- the alkyl group of carbon numbers 10-16, and R' -- 'is the alkyl group of carbon numbers 9-15.].

[0013] The compound of the following general formula (II) is used for this invention as a (c) component.

R₄-OCH₂CH(OH)CH₂OH (II)

the inside R₄ of [type -- carbon numbers 1-18 -- desirable -- 3-11 -- more -- desirable -- the hydrocarbon group of 3-8 -- they are an alkyl group or an alkenyl radical preferably.]

the compound of a general formula (II) -- epoxy compounds, such as R₄-OH, epihalohydrin, and glycidol, -- BF₃ etc. -- the approach of making react using an acid catalyst and manufacturing is common. Moreover, by such manufacture approach, 20% or more of alkyl poly glyceryl ether polymers which many glyceryl groups added exists in the compound of a general formula (II). What reduced the isomer and the polymer to 15 or less % of the weight preferably less than 20% of the weight although it did not interfere in this invention even if the above-mentioned polymer used the compound of the mixed general formula (II) is desirable, and it is especially a general formula (III). It is desirable to manufacture the compound of a general formula (II) using an aluminum catalyst.

aluminum(R₅-SO₃)_l(R₆)_m(R₇)_n (III) R₅ shows among [type the hydrocarbon (except for an alkyl halide radical) which may have the substituent, R₆ shows the aliphatic hydrocarbon oxy-radical or halogen atom which may have the hydrocarbon group which may have the substituent, and the substituent, and R₇ shows the aromatic hydrocarbon oxy-radical which may have the substituent. l, m, and n are the number of 0-3, respectively, and are l+m+n=3. However, l is not 0.]

Sulfonic acids are made to react to trialkylaluminium, thoria RUKOKI sial minium, or the Tori aluminium halide as a process of this catalyst, and it is the alkyl group, alkoxy group, or halogen radical of this aluminium compound in these sulfonates 1 The section or after permuting all, it can manufacture by permuting the remaining alkyl groups, alkoxy groups, or halogen radicals by still more suitable alcohols or phenols. This substitution reaction is performed by carrying out heating mixing in solvents, such as a hydrocarbon and alcohol.

[0014] When using the above-mentioned aluminium catalyst by this invention R2-OH is received in epoxy compounds, such as epihalohydrin and glycidol. The amount of 0.5-1.5 mol times, The amount use of 1.0-1.2-mol double is carried out preferably, and it is a general formula (III). R2-OH is received in an aluminium catalyst. The amount of 0.001-0.1 mol times, It is preferably good that 10-120 degrees C reacts preferably 0.01-0.05 mol time ***** and reaction temperature at 70-110 degrees C for 1 to 5 hours.

[0015] It is desirable to blend 30 % of the weight for the (a) component, and to blend especially preferably 0.5 - 20% of the weight and (c) component with the liquid cleaning agent of this invention for the 0.5 - (b) component one to 20% of the weight 0.5 to 30% of the weight 0.1 to 30% of the weight especially preferably 0.1 to 50% of the weight preferably in respect of the washing engine performance. As for the weight ratio of (a)/(b), it is still more desirable that it is 50 / 50 - 80/20.

[0016] In this invention, even if it blends surfactants other than the (a) component and the (b) component, alkali chemicals, a sequestering agent, and a stabilizing agent in addition to the above-mentioned indispensable component, it does not interfere.

[0017] (a) As surfactants other than a component and the (b) component, one or more sorts of a cationic surfactant, a nonionic surface active agent, and an amphoteric surface active agent can be used. As a cationic surfactant, as a nonionic surface active agent, polyoxyalkylene alkyl or the alkenyl ether, alkyl glycoside, a glucose amide, etc. are mentioned, and quarternary ammonium salt is mentioned for sulfobetaine, carbobetaine, etc. as an amphoteric surface active agent. the inside of these -- especially -- carbon numbers 8-18 -- 10-14, 5-50 average addition mols, and the quarternary ammonium salt that has the alkyl group or alkenyl radical of the polyoxyethylene alkyl of 6-30 or the alkenyl ether, and at least one carbon numbers 10-18 preferably are preferably desirable. As for other surfactants, it is desirable to blend 0.1 to 30% of the weight especially preferably into a liquid cleaning agent from the point of the washing engine performance 0.1 to 40% of the weight.

[0018] In order to raise a detergency to this invention further in addition to the above, (a) - (c) component, it is desirable to blend alkali chemicals. As alkali chemicals, alkanolamines, such as silicate, such as carbonates, such as hydroxides, such as a sodium hydroxide, a potassium hydroxide, and a calcium hydroxide, a sodium carbonate, potassium carbonate, and sodium sesquicarbonate, a specific silicate, and a potassium silicate, monoethanolamine, diethanolamine, triethanolamine, and monomethyl monoethanolamine, can be mentioned, and a sodium hydroxide, a potassium hydroxide, monoethanolamine, and monomethyl monoethanolamine are especially

desirable. These alkali chemicals are 0.1 - 20 % of the weight especially preferably 0.01 to 20% of the weight preferably from the point of a cleaning effect.

[0019] Moreover, a sequestering agent may be blended with the liquid cleaning agent of this invention. As a sequestering agent, a phosphoric-acid system compound or its salts, such as (1) phytic acid, (2) Ethane -1, 1-diphosphonic acid, ethane-1,1,2-triphosphonic acid, Ethane-1-hydroxy - 1 and 1-diphosphonic acid and its derivative, ethanehydroxy-1,1,2-triphosphonic acid, Ethane -1, 2-dicarboxy - Phosphonic acid or its salts, such as 1, 2-diphosphonic acid, and methane hydroxy phosphonic acid, (3) 2-phosphono butane -1, 2-dicarboxylic acid, 1-phosphono butane - 2, 3, 4-tricarboxylic acid, A phosphono carboxylic acid or its salts, such as alpha-methyl phosphono succinic acid, (4) Amino acid or its salts, such as an aspartic acid, glutamic acid, and a glycine, (5) Nitrilotriacetic acid, an iminodiacetic acid, ethylenediaminetetraacetic acid, a diethylenetriamine pentaacetic acid, A glycol ether diamine tetraacetic acid, hydroxy ethylimino 2 acetic acid, An amino poly acetic acid or its salts, such as TORIECHIREN tetra-amine 6 acetic acid and djenkolic acid, (6) Diglycolic acid, an oxydi succinic acid, carboxymethyl malic acid, A citric acid, a lactic acid, a tartaric acid, oxalic acid, a malic acid, an oxydi succinic acid, Organic acids, such as a gluconic acid, a carboxymethyl succinic acid, and a KARUBOKIME chill tartaric acid, or the salts of those, (7) amino poly (methylene phosphonic acid), its salts, polyethylene polyamine poly (methylene phosphonic acid), or its salts is mentioned. In these, one or more sorts chosen from the above (2), (5), and (6) are desirable. The loadings of such a sequestering agent have 0.01 - 15 especially preferably desirable % of the weight 0.01 to 30% of the weight preferably from the point of the washing engine performance.

[0020] It is desirable to contain ethanol, ethylene glycol, propylene glycol, isopropanol, a polyethylene glycol, a polypropylene glycol, a glycerol, and a sorbitol as a phase stabilizing agent in this invention, and it is desirable to blend preferably the polyethylene glycol of molecular weight 200-2000 0.1 to 3% of the weight especially preferably especially in respect of stability 0.05 to 5% of the weight.

[0021] Moreover, it is desirable to blend one or more sorts chosen as a low-temperature stabilizing agent from benzenesulfonic acid salts, toluenesulfonic acid salts, xylene sulfonates, and cumene sulfonates. As for such a low-temperature stabilizing agent, it is desirable to blend 0.1 to 4% of the weight preferably 0.05 to 5% of the weight into a cleaning agent.

[0022] As a hue stabilizing agent, it is desirable to blend reducing agents, such as a sulfite. In the case of a sodium sulfite, a reducing agent may be mixed 0.01 to 1.0% of the weight.

[0023] In addition to this in this invention, a dispersant, an antioxidant, perfume, coloring matter, preservation from decay and an antifungal agent, a thickener, etc. may be added by request.

[0024]

[Example] The synthetic example 1 (composition of c-1)

The temperature up was carried out to 90 degrees C, having put isoamyl alcohol 158g (1.78 mols), aluminum TORISO propoxide 3.61g (17.7mmol), and 9.40g (5.4 mols) of p-phenolsulfonic acid into 1L eggplant flask, and stirring it. Furthermore, the temperature up was carried out to 100 degrees

C after bottom (200mmHg) 1-hour stirring of reduced pressure, and epichlorohydrin 170g was dropped in 30 minutes, and was stirred for further 3 hours. This reaction mixture was kept at 50 degrees C, 800ml of sodium-hydroxide water solutions was dropped 48% in 1 hour, and the slice of the 400ml water was added and carried out after 3 more hour stirring. After removing a water layer, 500ml water washed the oil reservoir twice, and 280g of rough reactants was obtained. Next, 140g of rough reactants, 140g of water, 7.64g of lauric acids, and 2.14g of potassium hydroxides were put into 2L autoclave, and the temperature up was carried out to 157 degrees C, stirring. It cooled to the room temperature after 5-hour stirring, 500ml ethyl acetate extracted the reactant, 300 moreml water washed twice, and reduced pressure distilling off of the ethyl acetate was carried out. R4 in a general formula (II) which is equivalent to the (c) component as a result of analysis by the gas chromatography The compound of an isoamyl radical was obtained 95%. In addition, the polymer was 4%.

[0025] The synthetic example 2 (composition of c-2)

It replaced with isoamyl alcohol in the synthetic example 1, and manufactured by the same approach except having used 1.78 mols of n-octanol. (c) R4 in a general formula (II) equivalent to a component The compound of n-octyl radical was obtained 88%. In addition, the polymer was 9.3%.

[0026] The synthetic example 3 (composition of c-3)

It replaced with isoamyl alcohol in the synthetic example 1, and manufactured by the same approach except having used 1.78 mols of n dodecanol. (c) R4 in a general formula (II) equivalent to a component The compound of n-dodecyl was obtained 86%. In addition, the polymer was 10.2%.

[0027] The synthetic example 4 (composition of c-4)

Isoamyl alcohol 158g (1.78 mols) and BF₃ 4.9g (Tokyo formation) (34.9mmol) of ethyl ether complexes was put into 1L eggplant flask, and stirring, epichlorohydrin 170g was dropped in 30 minutes, and was stirred for further 3 hours. This reaction mixture was kept at 50 degrees C, 800ml of sodium-hydroxide water solutions was dropped 48% in 1 hour, and the slice of the 400ml water was added and carried out after 3 more hour stirring. After removing a water layer, 500ml water washed the oil reservoir twice, and 272g of rough reactants was obtained. Next, 140g of rough reactants, 140g of water, 7.64g of lauric acids, and 2.14g of potassium hydroxides were put into 2L autoclave, and the temperature up was carried out to 157 degrees C, stirring. It cooled to the room temperature after 5-hour stirring, 500ml ethyl acetate extracted the reactant, 300 moreml water washed twice, and reduced pressure distilling off of the ethyl acetate was carried out. R4 in a general formula (II) which is equivalent to the (c) component as a result of analysis The compound of an isoamyl radical was obtained 61%. In addition, the polymer was 35%.

[0028] (Example a) component, LAS;C12 straight-chain alkyl benzene sodium sulfonate, and SLES; polyoxyethylene lauryl ethereal sulfate sodium (2.5 ethyleneoxide average addition mols)

- An SLS; sodium-lauryl-sulfate (b) component and LDAO; a lauryldimethyl amine oxide and LAPAO;N-lauroyl aminopropyl N, the monoalkyltrimethyl ammonium chloride and the POELE; polyoxyethylene lauryl ether of N-dimethylamine oxide, other components, and the MAQAC; carbon numbers 16 and 18 (content ratio 3:7) (ten ethyleneoxide average addition mol number

average addition mols)

- MEA; monoethanolamine and PEG; -- a polyethylene glycol, weight-average-molecular-weight 1000 and a PPG; polypropylene glycol, weight-average-molecular-weight 1000 and PG; propylene glycol, pTS; p-toluenesulfonic acid sodium and a MA/DIB; maleic acid / JISO butene (50 / 50 mole ratios) copolymer, and molecular weight 10,000.

[0029] ** The liquid cleaning agent of Table 1 was produced using the liquid cleaning agent above-mentioned compound for garments, and c-1 to c-4, and the rate of cleaning shown below estimated the detergency. A result is shown in Table 1.

The <measuring method of rate of cleaning> aforementioned artificial solid fabric was judged to 5x5cm, the 0.2g [per artificial solid fabric] cleaning agent was applied to an area of 2x2cm, and TAGOTO meter washed 5 sets [1] by 100rpm (the water temperature of 20 degrees C, the degree of hardness DH of 4 degrees, washing time amount 10 minutes, and tap water during 5 minutes a stream rinse). The Soxhlet extraction was performed for 12 hours, having cut off correctly the part which applied the cleaning agent to 2x2cm after washing, and having used chloroform as the solvent for 5 sets [1]. Moreover, the non-washed artificial solid fabric was also extracted by the same actuation. Reduced pressure distilling off of the chloroform of an extract was carried out by the evaporator, the amount of the obtained extract triolein was calculated, and the rate of cleaning was measured by the degree type.

[0030]

[Equation 1]

$$\text{Degreasing rate (\%)} = \frac{\text{(the extracted amount in the non-washed stained cloth)} - \text{(the extracted amount in the washed stained cloth)}}{\text{(the extracted amount in the non-washed stained cloth)}} \times 100$$

[0031]

[Table 1]

			実施例				比較例		
			1	2	3	4	1	2	3
配合成分 重量 %	(a)成分	LAS		10	10				
		SLES	25	5	5	25	25	25	
		SLS		5	5				
	(b)成分	LDAO	10		10		10		35
		LAPAO		10		10			
	(c)成分	c-1	5					5	5
		c-2		5					
		c-3			5				
		c-4				5			
	MAQAC		5	5	5	5	5	5	5
	POELE		5	5	5	5	5	5	5
	MEA		4	4	4	4	4	4	4
	クエン酸		1	1	1	1	1	1	1
	PEG	Citric acid	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	PG		5	5	5	5	5	5	5
	エタノール		5	5	5	5	5	5	5
	pTS	ethanol		0.5	0.5	0.5	0.5	0.5	0.5
	MA/DIB		1	1	1	1	1	1	1
	水		残部	残部	残部	残部	残部	残部	残部
			100重量%						
pH*			10.5	10.5	10.5	10.5	10.5	10.5	10.5
性能評価	脱脂率(%)		93	92	86	88	80	82	75

Water
balance

Degreasing
rate

The pH value was prepared by dropping N/10 NaOH solution and N/10 H₂SO₄

[0032] ** The liquid cleaning agent of Table 2 was produced using the cleaning agent above-mentioned compound for tableware, and the detergency shown below was evaluated. A result is shown in Table 2.

<appraisal method of detergency> beef tallow -- as an indicator -- sudan red <3> (red dyes --) What applied to the white ceramic-manufactures pan (diameter of 25cm) the 2.5 g model dirt which added the product made from Wako Pure Chem Industry 0.1% of the weight Restroom washing was carried out using the sponge (10.5x7.5x4.0 cm, the quality of the material: polyurethane foam) into which 3g of cleaning agents and 27g (degree-of-hardness 3. 5DH and the preparation water of Mg ion / calcium ion =1/3 are used) of water of Table 2 were infiltrated. Making a visual judgment of whether the coloring matter on a pan was removable, washing was continuously performed until it did not add rinse actuation but it became impossible to have removed the coloring matter on a pan, and the number of dish (effective washing number of dish : if it is three or more dish success level) of the pan currently finally washed estimated.

[0033]

[Table 2]

			実施例					比較例		
			5	6	7	8	9	4	5	6
(a)成分	SLES	15	15	15	15	15	15	15	25	
(b)成分	LDAO	10		10		4	10			25
	LAPAO		10		10					
配合成分 （重量 %）	c-1	5				5		5	5	
	c-2		5							
	c-3			5						
	c-4				5					
POELE	3	3	3	3	3	3	3	3	3	3
PPG	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
エタノール	5	5	5	5	5	5	5	5	5	5
pTS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
水	残部	残部	残部	残部	残部	残部	残部	残部	残部	残部
合計		100重量%								
pH*		7	7	7	7	7	7	7	7	7
性能評価	洗浄枚数	6	6	4	5	5	3	3	3	3

washing
number
of dish